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A Catalogue of the Fishes of Essex County, Massachusetts, including the fauna of Massachusetts Bay and the contiguous deep waters.

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PREFATORY NOTE.

THE following catalogue has been prepared at the request of the officers of the Essex Institute as an aid to the arrangement and study of the Institute collection¹ of local species. It is believed to be complete to the date of publication, and, through the courtesy of Prof. Baird, includes the latest additions made to the fauna by the U. S. Fish Commission in its explorations from the summer stations at Gloucester (1878), Salem and Halifax (1877), Portland (1873), and Eastport (1872).

The field is by no means an untrodden one, having been well traversed during the half-century past by Wheatland, Storer, Agassiz, and Putnam. The improved methods of deep sea research and the zeal of the Gloucester fishermen have, however, been instrumental in adding many new species to the list. Too much cannot be said in commendation of the captains and crews of the off-shore fishing fleet, who have taken an active part in the scientific exploration of the fishing banks, and who have brought in during the past eight months several thousand natural history specimens in alcohol, besides making impor-

¹The scientific collections of the Essex Institute are deposited in the museum of the Peabody Academy of Science.

tant physical observations, and recording many valuable observations on the methods employed in the fisheries.

The latest list of the fishes of Massachusetts Bay is the one in Storer's "History of the Fishes of Massachusetts," published in 1867. In that work 134 species were enumerated, with a nominal list of 21 others in an appendix: of the 155 species mentioned, only 111 are marine or brackish-water species known to occur north of Cape Cod; 99 of these are recognized as valid species in this catalogue, and it is but justice to Dr. Storer's accurate workmanship to say that only two or three of those rejected are among the 134 which were described and illustrated by him in the body of his book, viz.: *Muraenoides ingens*, *Muraenoides macrocephalus* and *Petromyzon nigricans*. Several of his species have, however, been identified with well known European forms; and the laws of priority have made necessary changes in the nomenclature of several others.

We enumerate below 183 species, of which 163 inhabit salt or brackish water, 20 fresh water. Of the marine species, 104 have actually been recorded from Essex County, Massachusetts, or from localities within ten miles of its shores, the aggregate for Essex County, including the fresh water species, being 124: the number of marine species from within the limits of Massachusetts Bay, that is, inside of a line from Cape Cod to Cape Ann, is 133; while 29 are from the deeper off-shore waters in the vicinity of Georges, Le Have, Browns and Sable Island Banks. Out of the number recorded from Massachusetts Bay, 83 may be regarded as resident, or regularly to be expected; 46 others are known only as stragglers, and for knowledge of most of these science is indebted to the vigilant outlook kept by Capt. N. E. Atwood from his station on the tip end of Cape Cod. At the end of the paper are given tabular lists showing the faunal relations of the species which are enumerated in the catalogue.

Smithsonian Institution, March 1, 1879.

CATALOGUE.

Class **PISCES.**

Sub-class **TELEOSTEI.**

Order **PEDICULATI.**

Family **LOPHIIDÆ.**

1. **Lophius piscatorius** Linn. GOOSE-FISH. *Lophius americanus* Storer, Hist. Fish. Mass., 1867, p. 101, pl. xviii, fig. 2. A common resident of the deep waters, often coming to the shores. The museum

of the Essex Institute has a specimen, about four inches in length, taken on the banks of Newfoundland, in 1856, by L. J. Johnson. This is probably the most northern recorded occurrence of the species in the western Atlantic, except an unconfirmed statement by Pennant of its appearance in Hudson's Bay.

Order PLECTOGNATHI.

Sub-order GYMNODONTES.

Family ORTHAGORISCIDÆ.

2. *Mola rotunda* Cuv. SUN-FISH. *Orthogoriscus mola* Storer, Hist. Fish. Mass., 1867, p. 226, pl. xxxiv, fig. 2. Frequently seen on warm summer days, floating on its side at the surface. An individual, four feet in length, was taken off Gloucester, July 31, 1860. The Essex Institute has a specimen, stuffed, taken in Salem harbor in the summer of 1863.

Family TETRODONTIDÆ.

3. *Cirrisomus turgidus* (Mitch.) Jordan & Gilbert. SWELL-FISH. *Tetrodon turgidus* Storer, Hist. Fish. Mass., 1867, p. 223, pl. xxxiii, fig. 5. The museum of the Essex Institute has a specimen from Salem harbor, probably that recorded by Wheatland (Jour. Essex Co. Nat. Hist. Soc., 1852, p. 124) as having been taken in 1848. The species has also been found at Provincetown by Capt. N. E. Atwood.

Sub-order SCLERODERMA.

Family BALISTIDÆ.

4. *Balistes capriscus* Linn. DUSKY FILE-FISH. *Balistes fuliginosus* DeKay, Zool. N. Y. Fish., 1842, p. 339, pl. lvii, fig. 188. This species has several times been taken at Newport, R. I., and Wood's Hole, Mass. In the Colonial Museum at Halifax is a specimen said to have been taken on the coast of Nova Scotia. The species should be looked for in Massachusetts Bay.

5. *Alutera Schœpfi* (Walb.) Goode & Bean. ORANGE FILE-FISH. *Monacanthus aurantiacus* Storer, Hist. Fish. Mass., 1867, p. 9, pl. xxxiv, fig. 3. *Ceratacanthus aurantiacus* Gill. *Alutera cuspidata* DeKay. *Aluteres cuspidata* Storer, Hist. Fish. Mass., 1867, p. 233, pl. xxxv, fig. 2. Seldom seen north of Cape Cod. A single individual was taken at Forest River Lead Works, Salem, Aug. 9, 1845, and is now in the museum of the Essex Institute. *A. cuspidata* is the young of this species.

6. *Monacanthus setifer* Bennett. BENNETT'S FILE-FISH. *Monacanthus massachusettsensis* Storer, Hist. Fish. Mass., 1867, p. 231, pl. xxiv, fig. 4. *Monacanthus signifer* Storer, Hist. Fish. Mass., 1867, p. 232, pl. xxxv, fig. 1. Occasionally seen in summer in protected bays. Storer records specimens from Hingham, Lynn, Nahant, and Boston.

Order LOPHOBRANCHII.

Sub-order SYNGNATHI.

Family HIPPOCAMPIDÆ.

7. *Hippocampus antiquorum* Leach. SEA HORSE. ? *Hippocampus hudsonius* Storer, Hist. Fish. Mass., 1867, p. 222, pl. xxxiii, fig. 4. *Hippocampus antiquorum* Goode, Bull. U. S. National Museum, i, p. 45, 1878. A single individual was obtained on George's Banks in 1873, by a Portland mackerel schooner. This, or some nearly allied species, has been seen in Massachusetts Bay.

Family SYNGNATHIDÆ.

8. *Siphonostoma Peckianum* (Storer) Gill. *Syngnathus Peckianus* Storer, Hist. Fish. Mass., 1867, p. 218 (in part). *Siphonostoma Peckiana* Gill, MSS. A specimen was taken in South Mill Pond, Salem, in 1855 (Essex Institute collection).

9. *Siphonostoma fuscum* (Storer) Jordan & Gilbert. *Syngnathus Peckianus* Storer, Hist. Fish. Mass., 1867, p. 218 (in part), pl. xxxiii, fig. 3. Specimens were seined by the U. S. Fish Commission, near Beverly bridge, August, 1877.

Order HEMIBRANCHII.

Family CENTRISCIDÆ.

10. *Centriscus scolopax* Linn. SNIPE FISH. *Centriscus scolopax* Storer, Hist. Fish. Mass., 1867, p. 279. A single individual of this European species was taken at Provincetown, in 1857, by Capt. N. E. Atwood.

Family FISTULARIIDÆ.

11. *Fistularia serrata* Cuv. TOBACCO-PIPE FISH. *Fistularia serrata* Storer, Hist. Fish. Mass., 1867, p. 140, pl. xxv, fig. 1. A specimen of this species, taken at Rockport, Mass., Sept., 1865, is in the collection of the Essex Institute.

Family GASTEROSTEIDÆ.

12. *Gasterosteus aculeatus* Linn. TWO-SPINED STICKLE-BACK. *Gasterosteus biaculeatus* Storer, Hist. Fish. Mass., 1867, p. 40, pl. viii, figs. 2, 3; Putnam, Proc. Essex Institute, i, 1855, p. 148. A resident species associated with those which follow.

13. *Gasterosteus aculeatus*, sub-species, *trachurus*. *Gasterosteus Wheatlandi* Putnam, Proc. Essex Inst., v, 1867, p. 4; and in Storer, Hist. Fish. Mass., 1867, p. 278. Specimens of this form taken at Nahant, April 15, 1859, by R. H. Wheatland, M. D., are distinguished by (1) absence of scales on the posterior part of the body, there being six or eight on the anterior part, in front of the second dorsal spine; (2) the uncarinated tail; (3) its small size; and (4) its "short and deep" appearance. None of these characters are of specific value in this genus, the range of individual variation in form and squamation being very wide.

14. *Gasterosteus pungitius* Linn. MANY-SPINED STICKLEBACK. *Gasterosteus DeKayi* Putnam, Proc. Essex Inst., i, 1855, p. 148; Storer, Hist. Fish. Mass., 1867, p. 43, pl. viii, fig. 5. *Pygosteus occidentalis* Brevoort, in Gill's Catalogue of the Fishes of the Eastern Coast of North America, 1861, p. 16. A resident species, associated with the preceding and following species, but less abundant. The Essex Institute Museum has specimens two and a half inches long from Salem Mill Pond collected by F. W. Putnam.

15. *Apeltes quadracus* (Mitchill) Brevoort. FOUR-SPINED STICKLEBACK. *Gasterosteus quadracus* Putnam, Proc. Essex Inst., 1855, p. 148; Storer, Hist. Fish. Mass., 1867, p. 41, pl. viii, fig. 4. A resident species frequenting grassy bays and brackish water near the mouths of streams. Many specimens from Salem and vicinity in the museum of the Essex Institute.

Order TELEOCEPHALI.

Sub-order HETEROSOMATA.

Family SOLEIDÆ.

16. *Solea vulgaris* Linn. ENGLISH SOLE. *Solea vulgaris* Günther, Catalogue of the Fishes in the British Museum, iv, 1862, p. 463. Two individuals of this species were set free in Massachusetts Bay in 1877, by the U. S. Commissioner of Fisheries.

17. *Achirus lineatus* Cuv. AMERICAN SOLE. *Achirus mollis* Storer, Hist. Fish. Mass., 1867, p. 206, pl. xxxii, fig. 1. Storer records the capture of two specimens of this species in 1847, in Charles River, near Boston, and of a single specimen in 1850, at Nahant, which

appears to be its northern limit. Captain Atwood found it abundant at Provincetown, in 1856.

Family PLEURONECTIDÆ.

18. *Pleuronectes glaber* (Storer) Gill. SMOOTH FLOUNDER, FOOL-FISH, CHRISTMAS FISH. *Platessa glabra* Storer, Hist. Fish. Mass., 1867, p. 199, pl. xxxi, fig. 1. *Euchalarodus Putnami* Gill, Proc. Acad. Nat. Sci., Phila., 1864; Putnam, in Storer's Hist. Fish. Mass., 1867, p. 279. Specimens from Salem Harbor, Nov. 15, 1872, are in the Museum of the Peabody Acad. of Science, as well as several others collected by Mr. Walker, between 1868 and 1874. The Fish Commission obtained young specimens of about two and a half inches, at Beverly bridge, in August, 1877. Others in the collection of the Essex Institute were taken in Salem Harbor, Nov. 15, 1872, measuring from three to four inches. The species appears in Salem Harbor in abundance in late December and early January, coming up into shallow water to spawn. Dr. Bean has demonstrated the fact, that *Euchalarodus Putnami* Gill, is the male of this species. In every particular except in dentition this species exactly corresponds with *Pleuronectes passer* and *P. fesus* of Europe.

19. *Pseudopleuronectes americanus* (Walb.) Gill. FLAT-FISH. *Platessa plana* Storer, Hist. Fish. Mass., 1867, p. 195, pl. xxx, fig. 2. A very common resident species, occurring in winter and summer on muddy bottoms in shoal water.

20. *Limanda ferruginea* (Storer) Goode & Bean. RUSTY FLOUNDER. *Platessa ferruginea* Storer, Hist. Fish. Mass., 1867, p. 198, pl. xxx, fig. 4. *Platessa rostrata* H. R. Storer, Boston Journ. Nat. Hist. v, 1, 1857, p. 268, pl. viii, fig. 2. A common resident species inhabiting the deep waters of the bay in summer, and approaching the shores in winter. H. R. Storer's species from Labrador is not distinct from this.

21. *Glyptocephalus cynoglossus* (Linn.) Gill. CRAIG FLOUNDER. *Glyptocephalus cynoglossus* Gill, Proc. Acad. Nat. Sci., Phil., 1873, p. 361. *Glyptocephalus acadianus* Gill, l. c. A common resident species inhabiting the deepest part of the bay, but never discovered until 1877, when the U. S. Fish Commission found them in great abundance off Salem.

22. *Lophopsetta maculata* (Mitch.) Gill. SPOTTED SAND FLOUNDER. *Pleuronectes maculatus* Storer, Hist. Fish. Mass., 1867, p. 204, pl. xxxi, fig. 4. The Essex Institute museum has a specimen from Salem Harbor, by S. L. Walker, in July, 1870, and several specimens were obtained by the U. S. Fish Commission in 1878, in Gloucester Harbor, and at Milk Island. Storer knew it only from Province-

town, where it was observed by Capt. Atwood and himself. The species ranges north to Bucksport, Me.

23. Hippoglossoides platessoides (*Fabricius*) *Gill*. SAND DAB, ARCTIC FLOUNDER. *Platessa dentatus* Storer, Hist. Fish. Mass., 1867, p. 197, pl. xxx, fig. 3. *Hippoglossoides limandoides* Goode & Bean, Am. Journ. Sci. and Arts, xvii, 1876, p. 39. A common species in the deep waters of the bay, approaching the shores in winter.

24. Pseudorhombus dentatus (*Linnaeus*) *Günther*. COMMON FLOUNDER. *Platessa oblonga* Storer, Hist. Fish. Mass., 1867, p. 201, pl. xxxi, fig. 2. Storer states that this species occurs as far up the Cape as Wellfleet.

25. Pseudorhombus oblongus (*Mitchill*) *Günther*. FOUR-SPOTTED FLOUNDER. *Platessa quadrocellata* Storer, Hist. Fish. Mass., 1867, p. 203, pl. xxxi, fig. 3. A single individual was taken at the mouth of Salem Harbor, by the U. S. Fish Commission.

26. Hippoglossus vulgaris *Fleming*. HALIBUT. *Hippoglossus vulgaris* Storer, Hist. Fish. Mass., 1867, p. 192, pl. xxx, fig. 1. Once very abundant in Massachusetts Bay, but now found chiefly at a depth of 100-250 fathoms in the slopes of the outer banks where they are sought by about thirty Gloucester fishing schooners. Individuals are occasionally taken near the shore. In 1875, one weighing about 200 pounds was caught by a dory fisherman off Half-way Rock, Salem Harbor, and one still larger in Gloucester Harbor in August, 1878.

27. Platysomatichthys hippoglossoides (*Walb.*) *Goode & Bean*. TURBOT. *Reinhardtius hippoglossoides* *Gill*, Cat. Fish. E. Coast, N. America, 1861, p. 50; name of genus only. *Platysomatichthys pinquius* *Bleeker*, Verslagen en Mededelingen der Koninklijke Akademie van Wetenschappen, Amsterdam, xiii, 1862, p. 426. *Hippoglossus grœnlandicus* *Günther*, Cat. Fish. Brit. Mus., iv, 1862, p. 404. An arctic species, frequently brought in by the halibut schooners. Its range extends as far south as the gully between Le Have & Brown's Banks and George's Banks.

Sub-order JUGULARES.

Family MACRURIDÆ.

28. Macrurus Fabricii *Sundeval*. "GRENADIER," "RAT-TAIL." *Macrurus rupestris* *Günther*, Cat. Fish. Brit. Mus., iv, 1862, p. 390. An arctic deep-sea species which ranges as far south as George's Banks and is caught in great quantities on the trawl lines of the fishermen.

29. Macrurus Bairdii *Goode & Bean*. BAIRD'S GRENADIER. *Macrurus Bairdii* *Goode & Bean*, Amer. Jour. Sci. and Arts, xiv, 1877, pp. 471-473. A deep-sea species found in the deep waters of Massa-

chusetts Bay and the Gulf of Maine; discovered by the U. S. Fish Commission in 1877.

Family GADIDÆ.

30. *Gadus morrhua* Linnæus. COD-FISH. *Morrhua americanus* Storer, Hist. Fish. Mass., 1867, p. 165, pl. xxvii, fig. 4. Very abundant in the deeper waters off the coast of New England, and coming up the shoals and near the shores to spawn from November, about Cape Ann, to February, on George's Banks.

31. *Pollachius carbonarius* (Linn.) Bon. POLLOCK. *Merlangus purpureus* Storer, Hist. Fish. Mass., 1867, p. 180, pl. xxvii, fig. 3. An extremely abundant resident species which, but for foolish prejudice, would constitute an important food resource.

32. *Microgadus tomcodus* (Walb.) Gill. TOM-COD, FROST-FISH. *Morrhua pruinosa* Storer, Hist. Fish. Mass., 1867, p. 179, pl. xxvii, fig. 5. A resident species, entering brackish water; common about the wharves and bridges in summer, and taken with nets and hooks in winter in company with the smelt.

33. *Melanogrammus æglefinus* (Linn.) Gill. HADDOCK. *Morrhua æglefinus* Storer, Hist. Fish. Mass., 1867, p. 177, pl. xxviii, fig. 1. A common resident species.

34. *Phycis tenuis* (Mitch.) DeKay. HAKE. *Phycis americanus* Storer, Hist. Fish. Mass., 1867, p. 187, pl. xxix, fig. 3. A common resident species.

35. *Phycis chuss* (Walb.) Gill. *Phycis filamentosus* Storer, Hist. Fish. Mass., 1867, p. 189, pl. xxix, fig. 4. Less abundant than the preceding, from which it is distinguished only by the greater size of its scales.

36. *Phycis Chesteri* Goode & Bean. LONG-FINNED HAKE. *Phycis Chesteri* Goode & Bean, Proc. U. S. Nat. Mus., i, 1878, p. 256. A graceful species discovered in 1878, by the U. S. Fish Commission in the deep waters of the bay; only a few specimens have been seen.

37. *Phycis regius* (Walb.) Jord. & Gilb. SPOTTED HAKE. *Phycis regalis* Günther, Cat. Fish. Brit. Mus., iv, 1862, p. 354. *Urophycis regius* Gill, Proc. Acad. Nat. Sci., Phila. This species has been observed at Halifax, N. S., and from southern New England. It may therefore claim a place in the fauna of Massachusetts Bay.

38. *Haloporphyrus viola* Goode & Bean. BLUE HAKE. *Haloporphyrus viola* Goode & Bean, Proc. U. S. Nat. Mus., i, 1878, p. 257. A species inhabiting the outer slopes of the off-shore banks, at a depth of 200 fathoms or more, and frequently taken by the fishermen on their trawl lines.

39. *Onos* (*Rhinonemus*) *cimbricus* (Linn.) Goode & Bean.

Gadus cimbrius Linn., Syst. Nat. *Onos cimbrius* Goode & Bean, Proc. U. S. National Mus., 1878, p. 348. *Motella caudacuta* Storer, Hist. Fish. Mass., 1867, p. 183, pl. xxix, fig. 1. A resident of the deep waters of the bay where it occurs in considerable abundance. The young fish swim at the surface and have been wrongfully identified with the Mackerel Midge, *Ciliata argentata*, which is, at best, a doubtful species, and perhaps the young of a species of *Onos*.

40. **Brosmius brosmæ** (Müller) White. CUSK. *Brosmius flavescens* Storer (not Lesueur), Hist. Fish. Mass., 1867, p. 190, pl. xxix, fig. 2. *Brosmius brosmæ* Günther, Cat. Fishes Brit. Mus., iv, 1862, p. 369. *Brosmius flavescens* of Lesueur was apparently founded upon a deformed specimen. A common resident of the inshore fishing grounds, where it occurs in great abundance, lurking among the stones, but is soon caught up by the fishermen after the discovery of a new bank.

Family MERLUCIIDÆ.

41. **Merlucius bilinearis** (Mitch.) Gill. WHITING. SILVER HAKE. *Merlucius albidus* Storer, Hist. Fish. Mass., 1867, p. 185, pl. xxviii, fig. 2. A frequent visitor to the shores, probably a resident of the middle depths. Young were frequently trawled in deep water by the U. S. Fish Commission. This species may easily be distinguished from *M. vulgaris* of Europe by the greater number of rays in the first dorsal (X-XI in *M. vulgaris*, XII-XIII in *M. bilinearis*), and by the larger size of the scales (L. lat. about 150 in *M. vulgaris*, 100-110 in *M. bilinearis*).

Family LYCODIDÆ.

42. **Lycodes Verrillii** Goode & Bean. VERRILL'S LYCODES. *Lycodes Verrillii* Goode & Bean, Amer. Jour. Sci. and Arts, xvi, 1877, p. 474. A common resident of the deep water of the bay, first discovered in 1877, by the U. S. Fish Commission, in the Gulf of Maine, attains the length of seven inches or more.

43. **Lycodes Vahlîi** Reinhardt. VAHL'S LYCODES. *Lycodes Vahlîi* Günther, Cat. Fish. Brit. Mus., iv, 1862, p. 319. This species hitherto known only from Greenland, was taken by Capt. Z. Hawkins and the crew of the schooner "Gwendolen," of Gloucester, at a depth of 300 to 400 fathoms, in Lat. 42° 43' N, and between Long. 62° 20', and 63° 20' W.

44. **Lycodes paxillus** Goode & Bean. Proc. U. S. Nat. Mus., ii, 1879. A single specimen was obtained by Captain Collins in the gully between Le Have and Sable Island Banks.

45. **Zoarces anguillaris** (Peck.) Storer. MUTTON-FISH. *Zoarces*

anguillaris Storer, Hist. Fish. Mass., 1867, p. 97, pl. xvii, fig. 4. A common resident of deep water, frequently approaching the shore. In the young a large black blotch, almost equal in diameter to the eye, is found on the anterior part of the dorsal fin. This disappears with age, sometimes before, sometimes after the fish has attained the length of nine inches. No traces of this can be seen on the young of the European *Z. viviparus*, so far as observed by us.

Sub-order ACANTHOPTERI.

Family CRYPTACANTHIDÆ.

46. *Cryptacanthodes maculatus* Storer. WRY-MOUTH. *Cryptacanthodes maculatus* Storer, Report, 1839, p. 28, Hist. Fish. Mass., 1867, p. 34, pl. viii, fig. 6. *Cryptacanthodes inornatus* Gill. Proc. Acad. Nat. Sci., Phila., 1863, p. 332. (Albino variety.) The following specimens of this unusual species are known to us: (1) seven mentioned in Storer's work, one from Nahant, one from Dorchester, one from Provincetown, one from a beach in Nova Scotia, and three from Massachusetts Bay; (2) one collected at Provincetown in 1867, by Captain Atwood, and preserved by the Boston Society of Natural History; (3) seven collected by the U. S. Fish Commission on the coast of Massachusetts. Several specimens of this species have been taken on the shores of Essex County, and of the four known individuals of the albino form, described by Gill as *C. inornatus*, one was obtained at Marblehead and one at Swampscott.

Family STICHÆIDÆ.

47. *Eumesogrammus subbifurcatus* (Storer) Gill. *Pholis subbifurcatus* Storer, Hist. Fish. Mass., 1867, p. 92. Storer records the capture of a specimen at Nahant, in 1838. It has been taken by the U. S. Fish Commission at Grand Manan and Halifax, and by Prof. Verrill off Anticosti.

48. *Eumesogrammus unimaculatus* (Reinhardt) Goode & Bean. *Stichæus unimaculatus* Günther, Cat. Fish. Brit. Mus., iii, 1861, p. 283. A single specimen from the vicinity of Anticosti was sent to the National Museum for identification by Mr. Whiteaves.

49. *Leptoblennius serpentinus* (Storer) Gill. EEL-BLENNY. *Blennius serpentinus* Storer, Hist. Fish. Mass., 1867, p. 91, pl. xvii, fig. 1. (Represents the dorsal as divided, which was accidental.) A common resident of the deep waters of the bay; a favorite food of the Cod and Halibut.

50. *Leptoclinus aculeatus* (Reinh.) Gill. *Stichæus aculeatus* Günther, Cat. Fish. Brit. Mus., iii, 1861, p. 282. The U. S. Fish Com-

mission obtained several specimens of this arctic species, previously known only from Greenland, in Massachusetts Bay, at depths of forty to ninety fathoms.

Family XIPHIDIONTIDÆ.

51. *Murænoides gunnellus* (Linn.) Goode & Bean. ROCK-EEL. *Gunnellus mucronatus* Storer, Hist. Fish. Mass., 1867, p. 94, pl. xvii, fig. 2. Common among the rocks near the line of the tide. The Essex Institute has several specimens, the largest six inches long, from Naugus Head, July, 1862. *M. ingens* H. R. Storer, and *M. macrocephalus* Girard, are not distinct from this species.

Family ANARRHICHADIDÆ.

52. *Anarrhichas lupus* Linnæus. WOLF-FISH, CAT-FISH. *Anarrhichas vomerinus* Storer, Hist. Fish. Mass., 1867, p. 99, pl. xviii, fig. 1. Frequent in the deep waters and approaching the shore, particularly in winter.

53. *Anarrhichas minor* Olafsen. SPOTTED CAT-FISH, LEOPARD-FISH. *Anarrhichas minor* Streenstrup, Vidensk. Meddel. Naturh. Foren. Kjöbenhavn, 1876. This well marked species occurs both along the shores and in the deep water. The Fish Commission has specimens from off the mouth of Gloucester Harbor and from Eastport, Maine.

54. *Anarrhichas latifrons* Streenstrup & Hallg. BLUE CAT-FISH. *Anarrhichas latifrons* Streenstrup, op. cit. *Lycichthys latifrons* Gill, in Baird's Annual Record of Science and Industry for 1876. A resident of the deep waters in 200 to 400 fathoms on the off-shore banks. Many specimens have been received from the halibut schooners.

Family BATRACHIDÆ.

55. *Batrachus tau* Linnæus. TOAD-FISH. *Batrachus tau* Storer, Hist. Fish. Mass., 1867, p. 105, pl. xix, figs. 1 and 2. In the collection of the Boston Society of Natural History is a specimen, No. 494, labelled "Massachusetts Bay." The Fish Commission has collected no specimens north of Cape Cod.

Family CYCLOPTERIDÆ.

56. *Cyclopterus lumpus* Linnæus. LUMP-FISH. *Lumpus anglorum* Storer, Hist. Fish. Mass., 1867, p. 208, pl. xxxii, fig. 2. Frequently taken in winter; the young are often seen swimming at the surface in summer. A northern fish.

57. *Eumicrotremus spinosus* (*Fabricius*) *Gill*. SPINY LUMP-FISH. *Lumpus spinosus* Storer, Syn. Fish. N. A., 1846, p. 230. *Cyclopterus spinosus* Günther, Cat. Fish. Brit. Mus., iii, 1861, p. 157. Discovered by the U. S. Fish Commission in the deep water of Massachusetts Bay. Previously known only from Greenland.

Family LIPARIDIDÆ.

58. *Liparis vulgaris* *Fleming*. STRIPED LUMP-SUCKER. *Liparis vulgaris* Günther, Cat. Fish. Brit. Mus., iii, 1861, p. 169; Putnam, Proc. Amer. Assoc. Adv. Sci., 1874, p. 335. A resident of rocky bottoms among the roots of the kelp (*Laminaria saccharina*). Mr. J. H. Sears was the first to discover this species in the vicinity of Salem, or indeed in New England, collecting several specimens among the kelp near Baker's Island, in six feet of water.

59. *Liparis Montagu* *Donovan*. DARK LUMP-SUCKER. *Liparis* Sp. allied to *L. arctica* Putnam, in Storer's Hist. Fish. Mass., 1867, p. 280. *Liparis Montagu* Putnam, Proc. Amer. Assoc. Adv. Sci., 1874, p. 335. With the preceding species, but less frequent. Putnam, in his papers quoted above, refers to specimens collected by Mr. Alexander and himself at Salem and Nahant.

60. *Liparis ranula* *Goode & Bean*. Proc. U. S. National Mus., ii, 1879. A single specimen was trawled by the U. S. Fish Commission off Chebucto Head, N. S., at a depth of fifty-two fathoms.

Family TRIGLIDÆ.

61. *Prionotus evolans* (*Linn.*) *Gill*. STRIPED SEA-ROBIN. *Prionotus lineatus* Storer, Hist. Fish. Mass., 1867, p. 16, pl. v, fig. 4. This species is included with a query in a notice of several fishes of rare occurrence, by Dr. Henry Wheatland, in the Journal of the Essex Co. Natural History Society, 1852, p. 124. Its occurrence north of Cape Cod is still unconfirmed.

62. *Prionotus carolinus* (*Linn.*) *Cuv. & Val*. WEB-FINGERED SEA-ROBIN. *Prionotus palmipes* Storer, Hist. Fish. Mass., 1867, p. 18, pl. v, fig. 1. Storer records the capture of this species at Green Island and Phillips' Point, Lynn. Specimens from Salem are in the museum of the Essex Institute. We have examined the supposed type of *P. pilatus* Storer, in the museum of the Boston Society of Natural History. It appears to be identical with *P. punctatus*, but the origin of the specimen is somewhat doubtful.

Family AGONIDÆ.

63. *Aspidophoroides monopterygius* *Bloch., Storer*. GREEN-

LANDER. *Aspidophoroides monoptygius* Putnam, Proc. Essex Inst., i, 1855, p. 148; Storer, Hist. Fish. Mass., 1867, p. 32, pl. viii, fig. 1. An arctic species, occurring in great abundance in the deeper parts of the bay, and even as far south as Watch Hill, R. I. Storer had specimens from the stomachs of haddock, taken in Massachusetts Bay.

Family COTTIDÆ.

64. Cottus octodecimspinosus *Mitchill*. SCULPIN, TOAD-FISH. *Acanthocottus virginianus* Putnam, Proc. Essex Inst., i, 1855, p. 148; Storer, Hist. Fish. Mass., 1867, p. 28, pl. iv, fig. 2. A common resident species.

65. Cottus scorpius *Linn.* NORWAY SCULPIN. *Cottus scorpius* Günther, Cat. Fish. Brit. Mus., ii, p. 158. In an unpublished memoir Dr. Bean has demonstrated the occurrence of this species in Maine.

66. Cottus scorpius *L.* subsp. *grœnlandicus*. "DADDY SCULPIN," "GRUBBY," GREENLAND SCULPIN. *Acanthocottus variabilis* Putnam, Proc. Essex Inst., i, 1855, p. 148; Storer, Hist. Fish. Mass., 1867, p. 26, pl. iv, fig. 1. A very common resident of the bays, particularly in winter.

67. Cottus æneus (*Mitchill*) *Cuv. & Val.* PIGMY SCULPIN, "GRUBBY." *Cottus æneus* Mitchill, Trans. Lit. and Phil. Soc., N. Y., 1815, p. 381; DeKay, Zool. N. Y., Fishes, 1842, p. 52. (Not figure.) A common resident of shallow water. The Essex Institute has a specimen collected at Gloucester, May, 1859, by G. H. Price, labelled "*C. Grœnlandicus* young," also from Salem, 1859, collected by Caleb Cooke.

68. Uranidea gracilis (*Heckel*) *Gill.* RIVER BULL-HEAD. *Cottus gracilis* Storer, Hist. Fish. Mass., 1867, p. 24, pl. iv, fig. 3. This species occurs in the streams of eastern New England, and doubtless in Essex County, though we have no record of its capture within its limits.

69. Centridermichthys uncinatus (*Reinh.*) *Günther*. HOOK-EARED SCULPIN. *Centridermichthys uncinatus* Günther, Cat. Fish. Brit. Mus., ii, 1860, p. 172. A species very abundant in the deepest parts of the bay.

70. Triglops Pingelii *Reinh.* MAILED SCULPIN. *Triglops Pingelii* Günther, Cat. Fish. Brit. Mus., ii, 1860, p. 173. *Triglops pleurostictus* Cope. Occasionally taken in company with the preceding. An arctic species.

Family HEMITRIPTERIDÆ.

71. Hemitripterus americanus (*Gmel.*) *Storer*. SEA-RAVEN. *Hemitripterus acadianus* Storer, Hist. Fish. Mass., 1867, p. 35, pl. vii, fig. 4. Putnam, Proc. Essex Inst., i, 1855, p. 148. Common in deep

water approaching the shores. Putnam records it from deep water in Salem Harbor.

Family SCORPÆNIDÆ.

72. *Sebastes marinus* (Linnæus) Lütken. RED-FISH, "SNAPPER." *Sebastes norvegicus* Putnam, Proc. Essex, Inst., 1, 1855, p. 148; Storer, Hist. Fish. Mass., 1867, p. 38, pl. vii, fig. 1. Common in summer in the deeper parts of the bay, where it appears to breed. Approaches the shore in winter. Putnam records it from Salem Harbor. Certain Scandinavian naturalists recognize two North Atlantic species in this genus, *S. marinus* (or *norvegicus*) and *S. viviparus*. Those which have come to our notice correspond most nearly with the former. The latter appears to be a dwarf form inhabiting some of the fiords of Norway, and is considered by Collett and others to be a geographical race.

Family LABRIDÆ.

73. *Tautoga onitis* (Linnæus) Günther. TAUTOG. *Tautoga americana* Storer, Hist. Fish. Mass., 1867, p. 110, pl. xx, fig. 2. Abundant in many localities, near rocky ledges and points.

74. *Tautogolabrus adspersus* (Walb.) Gill. CUNNER, PERCH. *Ctenolabrus ceruleus* Storer, Hist. Fish. Mass., 1867, p. 108, pl. xx, fig. 1. Common everywhere in shallow water and in harbors. Called "Nipper" at Salem.

Family XIPHIIDÆ.

75. *Xiphias gladius* Linnæus. SWORD-FISH. *Xiphias gladius* Storer, Hist. Fish. Mass., 1867, p. 71, pl. xiii, fig. 2. Abundant along the coast in summer, occasionally coming near the shores.

Family TRICHIURIDÆ.

76. *Trichiurus lepturus* Linn. SCABBARD FISH. *Trichiurus lepturus* Storer, Hist. Fish. Mass., 1867, p. 69, pl. xii, fig. 1. Storer records the capture of this species at Wellfleet, in the summer of 1845. A specimen labelled "Salem Harbor," is in the museum of the Essex Institute. We are unable to learn the date of its capture.

Family SCOMBRIDÆ.

77. *Scomber scombrus* Linn. MACKEREL. *Scomber vernalis* Storer, Hist. Fish. Mass., 1867, p. 54, pl. xi, fig. 2; Putnam, Proc. Essex Inst., 1856, i, p. 201. Visit the coast of New England yearly in enormous schools, appearing in Massachusetts Bay in May, where,

after spawning, they remain until October or November. Stragglers are occasionally taken in the winter.

78. Scomber DeKayi Storer. CHUB-MACKEREL, "THIMBLE-EYE." *Scomber DeKayi* Storer, Hist. Fish. Mass., 1867, p. 52, pl. xi, fig. 1. This species was once very abundant, especially from 1814 to 1825, but appears now to have become extinct in our waters. Specimens are much desired by naturalists. It is probably identical with one of the European species, perhaps *S. pneumatophorus*.

79. Sarda pelamys (Linn.) Cuv. BONITO. *Pelamys sarda* Storer, Hist. Fish. Mass., 1867, p. 63, pl. xi, fig. 5. A summer visitor about Cape Cod, appearing in great schools in company with the Blue-fish.

80. Orcynus thynnus (Linn.) Goode. HORSE MACKEREL. *Thynnus secundidorsalis* Storer, Hist. Fish. Mass., 1867, p. 65, pl. xii, fig. 4. The Horse Mackerel, barracouta, or albacore is of late years a common summer visitor. In 1878 Capt. Henry Webb killed thirty-seven monsters of this species at his weir on Milk Island. A specimen, now preserved in the Essex Institute, was stranded on the flats of North River, Salem, Aug. 23, 1846. Its length was nine feet, six inches. Another specimen, weighing 775 pounds, stranded on the beach at Beverly, July 29, 1877.

81. Orcynus alliteratus (Raf.) Gill. LITTLE TUNNY. *Thynnus thunnina* Günther, Cat. Fish. Brit. Mus., ii, 1860, p. 364. This species has lately made its appearance on our coast in summer. We are not aware that any have yet been taken in Massachusetts Bay, but they are certain to be found at no distant period.

82. Orcynus pelamys (Linn.) Poey. OCEANIC BONITO. *Thynnus pelamys* Günther, Cat. Fish. Brit. Mus., ii, 1860, p. 364. *Orcynus pelamys* Goode & Bean, Proc. U. S. National Museum, 1878, p. 24. A single individual of this European species was obtained at Provincetown in 1860, by Mr. J. H. Blake, and many have since been found to visit the Vineyard Sound.

83. Orcynus alatunga (Linn.) Gill. LONG-FINNED TUNNY. *Thynnus alatunga* Günther, Cat. Fish. Brit. Mus., ii, 1860, p. 366. A specimen was obtained by Capt. William Thompson, of the schooner "Magic," of Gloucester, in the summer of 1878, on Banquereau, on a trawl, at a depth of 300 fathoms.

84. Orcynus argentivittatus (Cuv. & Val.) Goode. FROSTED BONITO. *Thynnus argentivittatus* Günther, Cat. Fish. Brit. Mus., ii, p. 366. Three or four specimens of a large *Orcynus*, received from the New England coast, are provisionally referred to this species.

85. Cybium maculatum Cuv. SPANISH MACKEREL. *Cybium maculatum* Storer, Hist. Fish. Mass., 1867, p. 68, pl. xiii, fig. 1. Storer records the capture of an individual of this species at Lynn, July 24, 1841, and states that specimens were obtained at Provincetown.

town in August, 1847, and by Captain Atwood, at Monhegan Island in Maine.

Family CARANGIDÆ.

86. *Carangus hippos* (Linn.) Gill. CREVALLÉ. *Caranx defensor* DeKay, Zool. of N. Y. Fishes, 1835, p. 120, pl. xxiv, fig. 72. Wheatland, Journ. Essex Co. Nat. Hist. Soc., 1852, p. 124. A specimen about eighteen inches in length was taken at Lynn Beach by Joseph True and its stuffed skin is preserved by the Essex Institute. This is the only instance of its occurrence north of Cape Cod.

87. *Paratractus pisquetus* (Cuv. and Val.) Gill. JACK, YELLOW CREVALLÉ. ? *Caranx chrysos* Storer, Hist. Fish. Mass., 1867, p. 75, pl. xiv, fig. 3. This species, cited by Storer, l. c., as *C. chrysos*, is, undoubtedly, *P. pisquetus*, judging from the forty-eight plates in the lateral line. He had seen a single individual from one of the bridges between Boston and Charlestown. Capt. Atwood found Storer's *C. chrysos* occasionally at Provincetown. A single individual was taken in a net off Gloucester, Sept. 18, 1878.

88. *Argyriosus vomer* (Linn.) Cuv. & Val. DOLLAR-FISH. *Argyriosus unimaculatus* Storer, Hist. Fish. Mass., 1867, p. 78, pl. xiv, fig. 2. The Peabody Academy has specimens collected by A. F. Gray at Danvers, Aug. 26, 1876, and in North River, Salem, 1876, by J. W. Kingsley. The Fish Commission obtained several specimens from Magnolia and Gloucester, in 1878, and the species has since been obtained at Halifax, N. S., by Mr. J. Matthew Jones.

89. *Seriola zonata* (Mitchill) Cuv. and Val. BANDED RUDDER-FISH. *Seriola zonata* Storer, Hist. Fish. Mass., 1867, p. 79, pl. xv, fig. 5. *Halatractus zonatus* Gill, Proc. Acad. Nat. Sci., Phila., 1862, p. 442. Storer records two specimens taken in the harbor of Wellfleet, one in August, 1844, and one in November, 1849. Capt. Atwood, in 1856, records its occasional occurrence at Provincetown. In the museum of the Essex Institute are two specimens, one from Beverly, taken by Samuel Porter, May 16, 1866; another from North River, Salem, taken by S. F. Goldthwaite.

Family STROMATEIDÆ.

90. *Palinurichthys perciformis* (Mitch.) Gill. RUDDER-FISH. *Palinurus perciformis* Storer, Hist. Fish. Mass., 1867, p. 74, pl. xiii, fig. 3. The Rudder-fish may usually be found in summer under floating spars at sea. The Essex Institute has a specimen from Salem, Aug. 6, 1855.

91. *Poronotus triacanthus* (Peck) Gill. BUTTER-FISH. *Rhombus triacanthus* Storer, Hist. Fish. Mass., 1857, pl. xv, fig. 4. This

species is not unusual in summer, occurring even as far north as Halifax, N. S. Specimens from Annapolis, N. S., and from Salem Harbor, are in the Essex Institute collection. At Provincetown, according to Capt. Atwood, it is very common, and is known as the "Sheepshead." Storer had it from Boston.

Family ZENIDÆ.

92. *Zenopsis ocellatus* (Storer) Gill. DORY. *Zeus ocellatus* Storer, Proc. Bost. Soc. Nat. Hist., vi, 1858, p. 385; Putnam in Storer, Hist. Fish. Mass., 1867, p. 279. *Zenopsis ocellatus* Gill., Proc. Acad. Nat. Sci., Phila., vi, p. 888. A single individual was obtained at Provincetown, by Capt. N. E. Atwood, which is preserved in the collection of the Boston Society of Natural History—the only specimen of the species. For 92a see p. 31.

Family SCIÆNIDÆ.

93. *Cynoscion regalis* (Bloch.) Gill. SQUETEAGUE, WEAK-FISH. *Otolithus regalis* Storer, Hist. Fish. Mass., 1857, p. 44, pl. ix, fig. 1. This species rarely passes to the north of Cape Cod, but, in 1878, three individuals were taken in the weir at Milk Island, Cape Ann.

94. *Pogonias cromis* (Linn.) Cuvier. DRUM. *Pogonias chromis* Günther, Cat. Fishes E. Coast, N. A., ii, 1860, p. 270. One or two individuals of this southern species have been observed at Provincetown.

95. *Menticirrus nebulosus* (Mitch.) Gill. KING-FISH. *Umbrina nebulosa* Putnam, Proc. Essex Inst., i, 1856, p. 201; Storer, Hist. Fish. Mass., 1867, p. 46, pl. ix, fig. 4. Storer records four specimens, one from a lobster pot at Boston Lighthouse, taken previous to 1833; one from Lynn, 1840; and two from Provincetown, July, 1846 and Nov., 1847, in mackerel nets. The Salem Collection includes two specimens: one, eight inches long, taken off Marblehead Light, Oct. 15, 1872, by J. P. Haskell; another, six and one-half inches long, taken at Spite Bridge, Danvers, Oct. 28, 1874. No others are recorded from north of Cape Cod.

Family SPARIDÆ.

96. *Stenotomus argyrops* (Linn.) Gill. SCUPPAUG, SCUP. *Pagrus argyrops* Putnam, Proc. Essex Inst., i, 1856, p. 201; Storer, Hist. Fish. Mass., 1867, p. 49, pl. x, fig. 3. This species, formerly, rarely passed the boundary of Cape Cod; in 1878, however, thirty-seven were taken at the Milk Island, Weirs, and they appear to be increasing in abundance.

This species does not appear to be indigenous north of Cape Cod. Storer gives the following account of its introduction: "Mr. James Newcomb, fishmonger, in the Boston market, informs me that, in the year 1831 or 1832, a smack-load of Scapaugs arrived in Boston Harbor. A portion of them were purchased by subscription among the fishermen in the market, and thrown into the harbor. The next season two specimens were caught from our wharves; in the summer of 1835, one individual was taken at Nahant, and was considered a very strange fish, no specimen having been known to have been seen there before; in 1836, still another was captured at Nahant. As no specimen had ever been taken so far north before, and as the few taken would lead to the inference that those which had been transplanted from Buzzard's Bay had not bred in the cold waters of this portion of Massachusetts Bay, we are led to believe that the individuals taken immediately around Boston, were of the number originally brought from the south. In the year 1834 or 1835, Capt. Wm. Downes, of Holmes' Hole, carried a smack-load of this species from Vineyard Sound and threw them overboard in Plymouth Harbor." *Op. cit.*, p. 51. Storer, writing in 1867, says, that "within a few years small numbers have appeared north of Cape Cod and are yearly captured at Wellfleet and Sandwich."

Judging from the rare occurrence of the species thus introduced, it can hardly be considered to have become naturalized; the few which have been taken were doubtless summer stragglers. In the Boston Society's Museum is a specimen taken at Swampscott, June 29, 1860, by J. Phillips. In the Salem Museum is another taken in Salem harbor, July 23, 1860, by C. A. Putnam. Scup become abundant on the south side of Cape Cod, from the fifth to the twelfth of May, which would allow ample time for the appearance of a part of the school off the eastern coast of Massachusetts, as early as the dates recorded.

Mr. Hinckley, Pres. of Phila., Wilm. & Balt. R. R., informs us that in the winter of 1833 he found a dead scuppaug on the Cohasset shore; this was its first occurrence in that locality, and none of the fishermen knew it.

In 1856, Capt. Atwood recorded the Scup as very rare at Provincetown.

Family CENTRARCHIDÆ.

97. *Lepiopomus auritus* (Linn.) Raf. RED-TAILED BREAM. *Pomotis appendix* Storer, *Hist. Fish. Mass.*, 1867, p. 14, pl. iii, fig. 4. This species occurs in Wenham pond and other bodies of fresh water in Essex County.

98. *Eupomotis aureus* (Walb.) Gill & Jordan. "PUMPKIN

SEED." POND-FISH. *Pomotis vulgaris* Storer, Hist. Fish. Mass., 1867, p. 12, pl. iii, fig. 1. This species abounds in the fresh water ponds.

99. *Enneacanthus obesus* (Baird) Gill. SPOTTED SUN-FISH. *Enneacanthus obesus* Jordan, Man. Vertebrates, N. America, 1877, p. 245. We notice in the collection of the Essex Institute several specimens of this little species from Wenham lake, Danvers and Beverly.

100. *Micropterus pallidus* (Raf.) Gill & Jordan. BLACK BASS. *Huro nigricans* DeKay, Zool. of New York Fishes, p. 15, pl. lxix. The Black Bass has been introduced from northern New York into numerous ponds throughout the thickly settled portions of New England. The allied species, *Micropterus achigan*, the Small-mouthed Black Bass, has also been placed in the waters of Massachusetts, and is probably found in Essex County.

Family SERRANIDÆ.

101. *Centropristis atrarius* (Linn.) Bon. BLACK SEA-BASS. *Centropristes varius* Putnam, Proc. Essex Inst., 1855, p. 144; Storer, Hist. Fish. Mass., 1867, p. 10, pl. ii, fig. 4. Four individuals are recorded from north of Cape Cod; one from Nahant, July 1, 1846, Storer; one from Salem harbor, May 22, 1855, Putnam; one from Beverly bar, June 20, 1860; and one from Salem, 1866, Wheatland; the latter two in the museum of the Essex Institute.

Family PERCIDÆ.

102. *Perca fluviatilis* L. POND PERCH. *Perca flavescens* Storer, Hist. Fish. Mass., 1867, p. 4, pl. ii, fig. 1. Abundant everywhere in ponds and streams.

Family ETHEOSTOMATIDÆ.

103. *Boloeosoma Olmstedii* (Storer) Ag. STORER'S DARTER. *Etheostoma Olmstedii* Storer, Hist. Fish. Mass., 1867, p. 30, pl. iv, fig. 1. Probably occurs in the small streams of the country.

104. *Boleichthys fusiformis* (Girard) Jordan. RED-SIDED DARTER. *Boleichthys fusiformis* Jordan, Manual Vertebrates, N. A., 1876, p. 228. This species was described from Charles river. The Essex Institute has specimens from a small brook of Melrose pond, collected May 12, 1860; from Wenham lake and Newhall's crossing.

Family LABRACIDÆ.

105. *Roccus lineatus* (Schn.) Gill. STRIPED BASS. *Labrax lineatus* Putnam, Proc. Essex Inst., i, 1855, p. 144. Storer, Hist. Fish.

Mass., 1867, p. 6, pl. i, fig. 4. This species is a common resident, penetrating far up the larger rivers.

106. *Morone americana* (Gmel.) Gill. WHITE PERCH. *Labrax rufus* Putnam, Proc. Essex Inst., i, 1855, p. 144; Storer, Hist. Fish. Mass., 1867, p. 9, pl. i, fig. 1. Common in brackish water, at the mouths of rivers, and in ponds to which the sea has access, sometimes becoming land-locked.

The Essex Institute has specimens from Floating Bridge pond, Salem, and from Flax pond, Lynn.

Family POMATOMIDÆ.

107. *Pomatomus saltatrix* (Linn.) Gill. BLUE-FISH. *Temnodon saltator* Storer, Hist. Fish. Mass., 1867, p. 81, pl. xv, fig. 1. The Blue-fish is an abundant summer resident, appearing in May or June, and departing in October. For a full account of their periods of absence from the coast, and abundance, see Professor Baird's essay on the subject, in his first report as Commissioner of Fisheries.

Family PRIACANTHIDÆ.

108. *Pseudopriacanthus altus* Gill. BIG EYE. *Priacanthus altus* Gill, Proc. Acad. Nat. Sci., Phila., 1863, p. 332; Putnam in Storer's Hist. Fish. Mass., 1867, p. 278. A specimen of this species was taken at Marblehead beach, Sept. 3, 1859, by Miss Mary Nichols, of Salem, and is preserved in the museum of the Essex Institute.

Family AMMODYTIDÆ.

109. *Ammodytes americanus* DeKay. SAND-EEL, LANT. *Ammodytes americanus* Storer, Hist. Fish. Mass., 1867, p. 216, pl. xxxiii, fig. 2. A common species, especially abundant about Cape Cod, burrowing in the sand shoals. A favorite food of the cod and other predaceous species.

110. *Ammodytes dubius* Rhdt. This species is inserted on the authority of Dr. Günther, who identified with it specimens from Boston, Mass.

Family ECHENEIDÆ.

111. *Echeneis naucrateoides* (Zuiew.) Gill. WHITE-TAILED REMORA, "SUCKER." *Echeneis albicauda* Wheatland, Proc. Essex Co. Nat. Hist. Soc., 1852, p. 124; Storer, Hist. Fish. Mass., 1867, p. 210, pl. xxxii, fig. 3. Wheatland refers to a specimen taken at Collins' cove, Aug., 1850. Another was taken at the mouth of the Merrimac river, June, 1870, Putnam.

112. Remoropsis brachyptera (Lowe) Gill. SWORD-FISH SUCKER. *Echeneis quatuordecemlaminatus* Storer, Hist. Fish. Mass., 1867, p. 212, pl. xxxii, fig. 4. A parasite of the sword-fish (*Xiphias gladius*) and not unfrequently accompanying that species into Massachusetts Bay. We have seen specimens from Newfoundland.

113. Remora jacobæa Lowe (Gill). A specimen labelled "*Echeneis remora*," taken in Salem harbor, is in the museum of the Essex Institute. It should be examined carefully before this species is permanently placed on the Massachusetts Bay list, though it is quite possible that an individual may have found its way to Salem, clinging to the bottom of some vessel from a southern port.

Family ATHERINIDÆ.

114. Chirostoma notatum (Mitch.) Gill. SILVERSIDES, SAND-SMELT. *Atherina notata* Storer, Hist. Fish. Mass., 1867, p. 87, pl. xvi, fig. 1. Abundant in summer, in large schools in the shallow bays, where they breed freely.

Family MUGILIDÆ.

115. Mugil brasiliensis Agassiz. STRIPED MULLET. *Mugil lineatus* Storer, Hist. Fish. Mass., 1867, p. 39, pl. xvi, fig. 4. Storer records the capture of a single individual at Provincetown in November, 1851.

Sub-order SYNENTOGNATHI.

Family BELONIDÆ.

116. Belone longirostris (Mitch.) Gill. *Belone truncata* Storer, Hist. Fish. Mass., 1867, p. 136, pl. xxiv, fig. 3. Occasionally ascending rivers far above tide water.

Family SCOMBRESOCIDÆ.

117. Scomberox saurus (Walb.) Flem. "BILL-FISH," SKIP-JACK. *Scomberesox storeri* Storer, Hist. Fish. Mass., 1867, p. 137, pl. xxiv, fig. 4. Schools of this remarkable species are occasionally seen in the autumn. The Essex Institute has specimens collected in Massachusetts Bay, Oct., 1855, by C. F. Robbins, and J. Chadwick. Capt. Hurlbert has seen them as far north as Monhegan Island, Maine. Putnam has recorded the occurrence of *Hemirhamphus* sp. in Danvers Mill Pond.

Sub-order HAPLOMI.

Family CYPRINODONTIDÆ.

118. Hydrargyra majalis (Walb.) Val. BANDED MUMMICHOG, "BASS FRY," "YELLOW TAIL." *Hydrargyra flavula* Storer, Hist. Fish.

Mass., 1867, p. 131, pl. xxiii, fig. 5, male; fig. 6, female. Common in brackish water. The Essex Institute has specimens one-fourth to one-third of an inch in length, collected in South Mill Pond, June 19, 1859, by R. H. Wheatland.

119. *Fundulus pisculentus* (Mitch.) Cuv. & Val. MINNOW, MUMMICHOG, "COBBLER." *Fundulus pisculentus* Storer, Hist. Fish. Mass., 1867, p. 128, pl. xxiii, fig. 3, male; fig. 4, female. Common everywhere in brackish water.

120. *Fundulus nigrofasciatus* (Les.) Cuv. & Val. *Fundulus nigrofasciatus* Storer, Hist. Fish. Mass., 1867, p. 129, pl. xxiii, fig. 1. Storer records this species from fresh ponds, Cambridge. It has not been studied by us.

121. *Fundulus multifasciatus* (Les.) Cuv. & Val. BARRED MINNOW. *Fundulus multifasciatus* Storer, Hist. Fish. Mass., 1867, p. 130, pl. xxiii, fig. 2. Storer speaks of having specimens from Concord and Lowell. A specimen from Wenham lake in the museum of the Essex Institute agrees with his description. The species has not been studied by us.

Family ESOCIDÆ.

122. *Esox reticulatus* Les. PICKEREL, "FEDERATION PIKE." *Esox reticulatus* Storer, Hist. Fish. Mass., 1867, p. 133, pl. xxiv, fig. 2. Common everywhere in ponds and large streams.

123. *Esox americanus* Gmelin. BROOK PICKEREL. *Esox ornatus* Storer, Hist. Fish. Mass., 1867, p. 135, pl. xxiv, fig. 2. Not uncommon in the brooks and ponds. The Essex Institute has specimens from Wenham lake.

Sub-order ISOSPONDYLI.

Family CHAULIODONTIDÆ.

124. *Chauliodus Sloanei* Schneider. CHAULIODUS. *Chauliodus Sloanei* Günther, Cat. Fish. Brit. Mus., p. 392. A specimen of this species was taken from the stomach of a cod-fish on George's banks by a Gloucester fisherman and presented to the Essex Institute, June 3, 1874, by Procter Brothers, of Gloucester.

Family SCOPELIDÆ.

125. *Scopelus gemmifer* Goode & Bean. *Scopelus gemmifer* Goode & Bean, MS.

126. *Scopelus speculiger* Goode & Bean. *Scopelus speculiger* Goode & Bean, MS. Specimens of the two undescribed species named above were brought in by several vessels of the Gloucester halibut fleet.

127. *Scopelus Humboldtii*. Dr. Storer mentions eight specimens identified by him with this species, one from Nahant and nine from Provincetown.

Family STOMIATIDÆ.

128. *Echiostoma barbatum* Lowe. A single individual of this species was received recently from one of the Gloucester fleet. It differs somewhat from Dr. Günther's, but agrees with Lowe's description. *E. barbatum* has been recorded only from Madeira.

129. *Malacosteus niger* Ayres. *Malacosteus niger* Ayres, Bost. Jour. Nat. Hist., 1849, p. 53; Günther, Cat. Fish. Brit. Mus., v., 1864, p. 428. A single specimen eight and one-half inches long is known. This was the type of Dr. Ayres' description; it was picked up at sea in lat. 42 degrees N., and long. 50 degrees W.

Family MICROSTOMIDÆ.

130. *Argentina syrtensium* Goode & Bean. WESTERN ARGENTINE. *Argentina syrtensium* Goode & Bean, Proc. U. S. Nat. Mus., i, 1878, p. 261. A single individual was taken from the stomach of a halibut on LeHave bank, in September, 1878.

131. *Osmerus mordax* (Mitch.) Gill. SMELT. *Osmerus viridescens* Storer, Hist. Fish. Mass., 1867, p. 149, pl. xxiv, fig. 4. Abundant in the fall and winter, entering brackish water for the purpose of spawning. This species is well separated from *O. eperlanus* by its smaller scales. *Mallotus villosus* has not been recorded south of Halifax, N. S.

Family SALMONIDÆ.

132. *Salmo salar* Linn. SALMON. *Salmo salar* Storer, Hist. 1867, p. 142, pl. xxv, fig. 2. At one time abundant in the rivers of Massachusetts and now being restored artificially. Enters the rivers in midsummer and spawns in November. *Salmo salar* subsp. *sebago*, the Land-locked Salmon, has been extensively introduced into the waters of the State.

133. *Salvelinus fontinalis* (Mitchill) Gill & Jordan. SPECKLED TROUT. *Salmo fontinalis* Storer, Hist. Fish. Mass., 1867, p. 144, pl. xxv, fig. 3. A resident of the brooks, some individuals entering the sea in summer.

Family ALEPIDOSAURIDÆ.

134. *Alepidosaurus ferox* Lowe. LANCET-MOUTH. *Alepidosaurus ferox* Günther, Cat. Fish. Brit. Mus., v, 1864, p. 421. Many

specimens are taken by the cod and halibut schooners on George's and other fishing banks at the depth of 80 to 400 fathoms.

Family ALEPOCEPHALIDÆ.

135. Alepocephalus Bairdii *Goode & Bean*. Proc. U. S. National Museum, ii, 1879. BAIRD'S ALEPOCEPHALUS. A single specimen about two feet long was taken by one of the Gloucester fishing vessels on the off-shore banks. Other genera of this family have recently been described from the abyssal faunæ of the mid-Atlantic and Pacific. The genus *Alepocephalus* has heretofore been known only from the Mediterranean.

Family CLUPEIDÆ.

136. Clupea harengus *Linnaeus*. HERRING. *Clupea elongata* Storer, Hist. Fish. Mass., 1867, p. 152, pl. xxvi, fig. 1. The herring schools make their appearance in October and November. They spawn near the shores in November and December and on George's banks later in the winter.

137. Alosa sapidissima (*Wilson*) Storer. SHAD. *Alosa præstabilis* Storer, Hist. Fish. Mass., 1867, p. 154, pl. xxvi, fig. 2. Shad enter the rivers in May in large schools for the purpose of spawning. They are often taken at sea in the fall. The Essex Institute has a specimen from Salem harbor.

138. Pomolobus vernalis (*Mitch.*) *Goode & Bean*. ALEWIFE. *Alosa tyrannus* Storer, Hist. Fish. Mass., p. 156, pl. xxvi, fig. 3. *Pomolobus pseudoharengus* Gill (in part). The alewives enter the rivers with the shad in spring. They frequent the coasts in large schools in summer, and some of them perhaps spawn at sea.

139. Pomolobus æstivalis (*Mitch.*) *Goode & Bean*. BLUE BACK, KYACK. *Alosa cyanonoton* Storer, Hist. Fish. Mass., p. 161, pl. xxvii, fig. 1. *Pomolobus pseudoharengus* Gill (in part). This species, which much resembles the preceding, from which it may be distinguished by its smaller eyes, lower fins, and black lining of the abdominal cavity, does not make its appearance until late spring and early summer.

140. Pomolobus mediocris (*Mitch.*) *Gill*. HICKORY SHAD. *Alosa lineata* Storer, Hist. Fish. Mass., 1867, p. 162, pl. xxvii, fig. 2. Capt. Atwood and Dr. Storer speak of this fish as abundant at Provincetown, and it doubtless occurs at the Essex County side of the bay. It is easily distinguished from the common alewife by its projecting under jaw.

141. Brevoortia tyrannus (*Latrobe*) *Goode*. MENHADEN, POGY. *Alosa menhaden* Storer, Hist. Fish. Mass., 1867, p. 158, pl. xxvi, fig. 4. A common summer visitor, appearing in enormous schools in May and

departing in October and early November. Immense quantities are seined for the oil and guano factories on the coast of Maine and at Provincetown. The Essex Institute has specimens of young, three and one-half inches long, taken at Spite bridge, Danvers, Oct. 28, 1874, interesting from the fact that few young of this species have been observed north of Cape Cod.

Family ENGRAULIDIDÆ.

142. *Engraulis vittatus* (Mitchill) Baird & Girard. ANCHOVY. *Engraulis vittatus* Storer, Hist. Fish. Mass., 1867, p. 163, pl. xxvii, fig. 3. Storer records the capture of a single specimen at Provincetown, in November, 1852.

Sub-order EVENTOGNATHI.

Family CATOSTOMIDÆ.

143. *Catostomus teres* (Mitch.) Les. SUCKER. *Catostomus bostoniensis* Storer, Hist. Fish. Mass., 1867, p. 124, pl. xxii, fig. 3. Very common in all fresh waters of Massachusetts.

144. *Erimyzon sucetta* (Les.) Jordan. CHUB-SUCKER. *Catostomus gibbosus* Storer, Hist. Fish. 1867, p. 124, pl. xxii, fig. 4. Common in fresh water; the Essex Institute has specimens from Miles river, Wenham.

Family CYPRINIDÆ.

145. *Carassius auratus* (Linn.) Bleeker. GOLD-FISH. *Cyprinus auratus* Storer, Hist. Fish. Mass., 1867, p. 115, pl. xxi, fig. 1. This species was introduced many years ago from China. Storer, writing in 1867, remarked "It thrives in quite a number of ponds in the neighborhood of Boston, connected with country seats, bearing well the rigors of our winter, and breeding freely." The Essex Institute has specimens from a pond in Salem.

146. *Luxilus cornutus* (Mitch.) Jordan. RED-FIN. *Hypsolepis cornutus* Storer, Hist. Fish. Mass., 1867, p. 118, pl. xxi, fig. 3. Common in streams; the Essex Institute has specimens from Wenham lake, and from the Merrimac river at Andover.

147. *Notemigonus chrysoleucus* (Mitch.) Jordan. SHINER. *Leucosomus americanus* Storer, Hist. Fish. Mass., 1867, p. 117, pl. xxi, fig. 2. Very common in ponds throughout New England. The Essex Institute has specimens from Wenham lake.

148. *Semotilus bullaris* (Raf.) Jordan. ROACH, "DACE." *Chilonemus pulchellus* Storer, Hist. Fish. Mass., 1867, p. 120, pl. xxii,

fig. 2. Not uncommon in fresh water. The Essex Institute has specimens from Wenham lake.

149. *Rhinichthys atronasmus* (Mitch.) Ag. BLACK-NOSED DACE. *Argyreus atronasmus* Storer, Hist. Fish. Mass., 1867, p. 122, pl. xxi, fig. 4. Common in brooklets everywhere in Massachusetts. The Essex Institute has specimens from Groveland.

Order NEMATOGNATHI.

Family SILURIDÆ.

150. *Amiurus catus* (Linn.) Gill. "BULL-HEAD," HORNED POUT. *Pimelodus atrarius* Storer, Hist. Fish. Mass., 1867, p. 118, pl. xx, fig. 3. Common in quiet ponds everywhere.

Order APODES.

Family CONGRIDÆ.

151. *Conger vulgaris* Cuv. CONGER EEL. Conger eels and their curious transparent young—"phantom fish"—are occasionally seen. The museum of the Essex Institute has a specimen of the larval form of the so-called *Leptocephalus*, collected at Nahant beach, July 22, 1858, by Caleb Cooke.

Family ANGUILLIDÆ.

152. *Anguilla vulgaris* Turton. EEL. *Anguilla bostoniensis* Storer, Hist. Fish. Mass., 1867, p. 214, pl. xxxiii, fig. 1. Eels are common in both fresh and salt water. They are supposed to descend to the sea in the fall for the purpose of spawning.

Family NEMICHTHYIDÆ.

153. *Nemichthys scolopaceus* Richardson. SNIPE-EEL. *Nemichthys scolopaceus* Günther, Cat. Fish. Brit. Mus., viii, 1870, p. 21. Two specimens of this remarkable eel-like fish have been obtained from the stomachs of fishes on George's banks.

Family SYNAPHOBRANCHIDÆ.

154. *Synaphobranchus pinnatus* (Gronow) Günther. TWIN-GILLED EEL. *Synaphobranchus pinnatus* Günther, Cat. Fish. Brit. Mus., viii, 1870, p. 23. A common resident of the deep waters of the off-shore banks in 200 to 300 fathoms, where individuals are often taken on the fishermen's trawl-lines.

Family SACCOPHARYNGIDÆ.

155. *Saccopharynx flagellum* *Mitchill*. GULPER. *Saccopharynx flagellum* Günther, Cat. Fish. Brit. Museum, viii, 1870, p. 22. A deep-sea fish. Mitchill's specimen was taken in latitude 52 degrees N.; long. 30 degrees W.

Family SIMENCHELYIDÆ.

156. *Simenchelys parasiticus* *Gill*. MS. PUG-NOSED EEL. Several specimens of an undescribed eel-like fish were obtained on the halibut trawls, on the off-shore banks. This strange form has much of the physiognomy of a Carapus (*Gymnotus*), and has a short, blunt snout, but is a true Apodal and has an eel-like tail. The branchial apertures are short longitudinal slits on each side of the throat below the pectorals, which are well developed; the dorsal commences about a head's length behind the pectorals; the anal considerably in advance of the second half of the total length. The skin has scales like those of *Anguilla*, linear, scattered, and disposed at right angles to each other. The head is very short; the premaxillaries and maxillaries of each side consolidated into a single piece and separated from that of the opposite side by the ethmoid, and provided with lamelliform posterior margin and an expanded antero-terminal process; mandible very deep; teeth blunt, uniserial; the operculum sabre-shaped. The type appears to belong to the suborder of Enchelycephali. The single species (*Simenchelys parasiticus*) is dark brown colored in life, and individuals have been found burrowing into the flesh of the halibut.

Sub-class GANOIDEA.

Super-order Chondrostei.

Order GLANIOSTOMI.

Family ACIPENSERIDÆ.

157. *Acipenser oxyrhynchus* *Mitchill*. SHARP-NOSED STURGEON. *Acipenser oxyrhynchus* Storer, Hist. Fish. Mass., 1867, p. 237, pl. xxxv, fig. 4. Ascending rivers and not unusual along the shores. The Essex Institute has a stuffed specimen from the Merrimac, at Lawrence, collected by C. K. Stevens.

158. *Acipenser brevirostris* *Lesueur*. BLUNT-NOSED STURGEON. *Acipenser brevirostrum* DeKay, Zool. of N. Y., 1842, p. 345. This short-nosed form of the coast sturgeon is represented in the museum of the Essex Institute by a stuffed skin obtained at Rockport, by J. N. Martin.

Sub-class **ELASMOBRANCHII.**Super-order **Holocephali.**Order **HOLOCEPHALI.**

Family CHIMÆRIDÆ.

159. Chimæra plumbea Gill. BROWN CHIMÆRA. *Chimæra plumbea* Gill, Bull. Phil. Soc., Washington, 1877. Very common in the deep water on the outer edges of banks north of George's Banks, and often brought in by the Gloucester halibut schooners.

Super-order **Plagiostomi.**Order **RAIÆ.**Sub-order **SARCURA.**Family **TORPEDINIDÆ.**

160. Torpedo occidentalis Storer. CRAMP-FISH. *Torpedo occidentalis* Storer, Hist. Fish. Mass., 1867, pl. 271, pl. xxxix, fig. 5. This species is rarely taken north of Cape Cod. Three or four individuals have been seen in summer on the south side of Cape Ann. One was taken near Lanesville, in 1878.

Family **RAIAIDÆ.**

161. Raia granulata Gill. MS. A remarkable species with back and ventral surface covered with minute sharp granular ossifications obtained by Capt. Joseph W. Collins on Le Have Bank. A species of the same type as *R. lævis*, and having 30-31 teeth on each side; the back granulated and slate-colored; the ventrals distinguished by reticulate markings, and the claspers slender and scarcely expanded.

162. Raia erinacea Mitchill. CLEAR-NOSED SKATE. *Raia diaphanes* Storer, Hist. Fish. Mass., 1867, p. 264, pl. 39, fig. 1. Abundant in the waters of Massachusetts bay at a depth in summer of twenty-five or thirty fathoms.

163. Raia radiata Donovan. Not uncommon in company with the preceding.

164. Raia eglanteria Lacepede. Occasionally captured in company with the preceding; a more southern species.

165. Raia lævis Mitchill. BARN-DOOR SKATE. *Raia lævis* Storer, Hist. Fish. Mass., 1867, p. 266, pl. xxxix, fig. 2. Frequently taken in deep water.

166. *Raia ocellata* Mitchill. SPOTTED SKATE. Two or three individuals were collected by the U. S. Fish Commission in 1878. This species is very abundant in shallow water at Portland, Me.

Family TRYGONIDÆ.

167. *Trygon centrura* (Mitch.) Gill. STINGAREE. *Pastinaca hastata* Storer, Hist. Fish. Mass., 1867, p. 268, pl. xxxiv, fig. 3. This species has not been observed north of Cape Cod, but we are informed by Capt. R. H. Hurlbert, of Gloucester, an accurate observer, that they are sometimes taken on the George's Banks.

Order SQUALI.

Family LAMNIDÆ.

168. *Lamna cornubica* (Gmel.) Flem. PORBEAGLE, MACKEREL SHARK. *Lamna cornubica* Günther, Cat. Fish. Brit. Mus., viii, 1870, p. 389. A young individual, agreeing with the description of this species by European authors, was taken off Gloucester, in Oct., 1878.

169. *Carcharodon Atwoodi* (Storer) Gill. MAN-EATER SHARK. *Carcharias Atwoodi* Storer, Hist. Fish. Mass., 1867, p. 246, pl. xxxvi, fig. 4. The type of this species was obtained at Provincetown. One or two instances of its capture in Massachusetts Bay are on record.

Family CETORHINIDÆ.

170. *Cetorhinus maximus* (Linn.) Blainv. BONE SHARK, GURRY SHARK. *Selachus maximus* Storer, Hist. Fish. Mass., 1867, p. 253, pl. xxxvii, fig. 3. This gigantic shark is sometimes encountered by the Gloucester fishermen. Prof. Verrill has recorded² the occurrence in the summer of 1870, at Eastport, Me., of three specimens twenty-five to thirty feet in length, and one previously taken in 1868, which measured thirty-five feet. Mitchill writing in 1814, spoke of its occasional occurrence at Provincetown. Storer mentions a specimen measuring thirty feet and three inches, harpooned in Provincetown Harbor, in 1839.

Family ODONTASPIDIDÆ.

171. *Eugomphodus littoralis* (Mitchill) Gill. SAND SHARK. *Carcharias griseus* Storer, Hist. Fish. Mass., 1867, p. 241, pl. xxxvi, fig. 1. Capt. Atwood records this species as very abundant at Provincetown, in 1856, and it doubtless is found in other parts of the bay.

² Bulletin Essex Institute, III, p. 6.

Family ALOPECIIDÆ.

172. *Alopias vulpes* (Linn.) Bon. SWINGLE-TAIL, THRASHER SHARK. *Carcharias vulpes* Storer, Hist. Fish. Mass., 1867, p. 245, pl. xxxvi, fig. 3. Several "Swingle-tails," have been taken within the past ten years, between Boston and Gloucester.

Family SPHYRNIDÆ.

173. *Sphyrna zygaena* (Linn.) Mull. & Henle. HAMMER-HEAD SHARK. *Zygaena malleus* Storer, Hist. Fish. Mass., 1867, p. 262, pl. xxxviii, fig. 3. According to Captain Atwood, the hammer-head is "seldom seen" at Provincetown.

174. *Eulamia obscura* (LeSueur). DUSKY SHARK. A "blue shark" is recognized by the fishermen of Massachusetts Bay, which is probably either this species or *E. Milberti*.

Family GALEORHINIDÆ.

175. "*Prionodon lamia*" Putnam. Bull. Essex Inst., vi, 1874, p. 72. This species was provisionally identified by Prof. Putnam from a tooth obtained on St. Peter's Bank belonging to a fish estimated to have been at least thirteen feet in length.

176. *Mustelus canis* (Mitch.) DeKay. SMOOTH DOG-FISH. *Mustelus canis* Storer, Hist. Fish. Mass., 1867, p. 251, pl. xxxvii, figs. 2, 2a. This species is not unusual about Provincetown in summer, and is occasionally taken in other parts of the bay. The Essex Institute has young specimens taken off the Central wharf, Salem, in 1856.

Family SPINACIDÆ.

177. *Squalus acanthias* Linn. DOG-FISH. *Acanthias americanus* Storer, Hist. Fish. Mass., 1867, p. 256, pl. xxxviii, fig. 1, 1a. Common everywhere in summer, coming up on the fishing grounds in immense schools and very annoying to fishermen.

178. *Centroscyllium Fabricii* (Rein.) Mull. & Henle. GREENLAND DOG-FISH. *Centroscyllium fabricii*, Günther, Cat. Fish. Brit. Mus., viii, 1870, p. 425. Common on the off-shore banks in company with *Centroscymnus*.

179. *Centroscymnus cœlolepis* Bocage & Capello. BLACK DOG-FISH. *Centrophorus cœlolepis* Günther, Catalogue Fish. Brit. Mus., viii, 1870, p. 423. This species is abundant on the off-shore banks, at the depth of 200 fathoms and more. It is ovoviviparous like *Squalus*.

Family ECHINORHINIDÆ.

180. *Echinorhinus spinosus* (Gmel.) Blainville. SPINOUS SHARK. *Echinorhinus spinosus* Günther, Cat. Fish. Brit. Mus., viii, 1870, p. 428. A single specimen of this species, the first seen in America, drifted ashore at Provincetown in December, 1878.

Family SCYMNIDÆ.

181. *Somniosus microcephalus* (Bloch.) Gill. SLEEPER SHARK. *Scymnus brevipinna* Storer, Hist. Fish. Mass., 1867, p. 259, pl. xxxviii, fig. 2. *Scymnus brevipinna* was described by Lesueur in 1818 from a stuffed specimen he saw at Marblehead. Storer mentions a specimen he saw at Marblehead. Storer mentions a specimen taken off Portland, Me., in 1846, and one at Nahant, as well as three at Provincetown, in 1848-9.

Class MARSIPOBRANCHII.

Order HYPEROARTIA.

Family PETROMYZONTIDÆ.

182. *Petromyzon marinus* Linn. LAMPREY EEL. *Petromyzon americanus* Storer, Hist. Fish. Mass., 1867, p. 275, pl. xxxviii, fig. 4. Occasionally seen, especially in the rivers. The Essex Institute has a specimen found clinging to a pollock in Salem market, May 25, 1858, and also young individuals from Beverly.

Order HYPEROTRETA.

Family MYXINIDÆ.

183. *Myxine glutinosa* Linn. HAG, SLIME-FISH. *Myxine glutinosa* Günther, Cat. Fish. Brit. Mus., viii, p. 510. Occasionally taken in deep water clinging to dead fish. The Fish Commission obtained specimens in the trawl, at 175 fathoms, forty-two miles east of Cape Ann. It was also dredged by Packard and Cooke in the "Bache," in 1873.

ADDENDUM.

92a. *Lampris guttata* Rebz. Mr. J. Matthew Jones informs us of the capture of this European species near Sable Island, N. S.

FAUNAL TABLES.

The following species are known to occur in Massachusetts Bay as permanent residents or regular visitants. Those which are found near the shores and on the ordinary fishing grounds, sixty-nine in number, are mentioned in ordinary type; those which occur in the deeper parts of the Bay and are not ordinarily seen, eighteen in number, are in italics; while in the same list are included the stragglers, of which only a few specimens have been taken and whose occurrence must be regarded as accidental. Of these there are forty-six species in all, and they are enclosed in brackets.

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| 1. <i>Lophius piscatorius</i> . | 33. <i>Melanogrammus æglefinus</i> . |
| 2. <i>Mola rotunda</i> . | 34. <i>Phycis tenuis</i> . |
| 3. [<i>Cirrisomus turgidus</i> .] | 35. <i>Phycis chuss</i> . |
| 4. [<i>Balistes capriscus</i> .] | 36. <i>Phycis Chesteri</i> . |
| 5. [<i>Alutera Schoepfli</i> .] | 37. [<i>Phycis regius</i> .] |
| 6. [<i>Monacanthus setifer</i> .] | 39. <i>Onos (Rhinonemus) cimbricus</i> . |
| 7. [<i>Hippocampus antiquorum</i> .] | 40. <i>Brosmius brosme</i> . |
| 8. <i>Siphonostoma Peckianum</i> . | 41. <i>Merlucius vulgaris</i> . |
| 9. <i>Siphonostoma fuscum</i> . | 42. <i>Lycodes Verrillii</i> . |
| 10. [<i>Centriscus scolopax</i> .] | 45. <i>Zoarces anguillaris</i> . |
| 11. [<i>Fistularia serrata</i> .] | 46. <i>Cryptacanthodes maculatus</i> . |
| 12. <i>Gasterosteus aculeatus</i> . | 47. [<i>Eumesogrammus subbifurcatus</i> .] |
| 13. [<i>Gasterosteus trachurus</i> .] | 49. <i>Leptoblennius serpentinus</i> . |
| 14. <i>Gasterosteus pungitius</i> . | 50. <i>Leptoclinus aculeatus</i> . |
| 15. <i>Apeltes quadracus</i> . | 51. <i>Murænoides gunnellus</i> . |
| 17. [<i>Achirus lineatus</i> .] | 52. <i>Anarrhichas lupus</i> . |
| 18. <i>Pleuronectes glaber</i> . | 53. <i>Anarrhichas minor</i> . |
| 19. <i>Pseudopleuronectes americanus</i> . | 55. [<i>Batrachus tau</i> .] |
| 20. <i>Limanda ferruginea</i> . | 56. <i>Cyclopterus lumpus</i> . |
| 21. <i>Glyptocephalus cynoglossus</i> . | 57. <i>Eumicrotremus spinosus</i> . |
| 22. <i>Lophopsetta maculata</i> . | 58. <i>Liparis vulgaris</i> . |
| 23. <i>Hippoglossoides platessoides</i> . | 59. <i>Liparis Montagui</i> . |
| 24. [<i>Pseudorhombus dentatus</i> .] | 61. [<i>Prionotus evolans</i> .] |
| 25. [<i>Pseudorhombus oblongus</i> .] | 62. [<i>Prionotus carolinus</i> .] |
| 26. <i>Hippoglossus vulgaris</i> . | 63. <i>Aspidophoroides monopterygius</i> . |
| 29. <i>Macrurus Bairdii</i> . | 64. <i>Cottus octodecemspinosus</i> . |
| 30. <i>Gadus morrhua</i> . | 66. <i>Cottus scorpius grœnlandicus</i> . |
| 31. <i>Pollachius carbonarius</i> . | 67. <i>Cottus æneus</i> . |
| 32. <i>Microgadus tomcodus</i> . | 69. <i>Centridermichthys uncinatus</i> . |

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| 70. <i>Triglops Pingelii.</i> | 118. <i>Hydrargyra majalis.</i> |
| 71. <i>Hemitripterus americanus.</i> | 119. <i>Fundulus pisculentus.</i> |
| 72. <i>Sebastes marinus.</i> | 127. [<i>Scopelus Humboldtii?</i>] |
| 73. <i>Tautoga americana.</i> | 131. <i>Osmerus mordax.</i> |
| 74. <i>Tautogolabrus adspersus.</i> | 132. <i>Salmo salar.</i> |
| 75. <i>Xiphias gladius.</i> | 133. <i>Salvelinus fontinalis.</i> |
| 76. [<i>Trichiurus lepturus.</i>] | 136. <i>Clupea harengus.</i> |
| 77. <i>Scomber scombrus.</i> | 137. <i>Alosa sapidissima.</i> |
| 78. [<i>Scomber DeKayi.</i>] | 138. <i>Pomolobus vernalis.</i> |
| 79. <i>Sarda pelamys.</i> | 139. <i>Pomolobus æstivalis.</i> |
| 80. <i>Orcynus thynnus.</i> | 140. <i>Pomolobus mediocris.</i> |
| 82. [<i>Orcynus pelamys.</i>] | 141. <i>Brevoortia tyrannus.</i> |
| 85. [<i>Cybium maculatum.</i>] | 142. [<i>Engraulis vittatus.</i>] |
| 86. [<i>Carangus hippos.</i>] | 151. <i>Conger vulgaris.</i> |
| 87. [<i>Paratractus pisquetus.</i>] | 152. <i>Anguilla bostoniensis.</i> |
| 88. [<i>Argyrosus vomer.</i>] | 152. <i>Anguilla vulgaris.</i> |
| 89. [<i>Seriola zonata.</i>] | 157. <i>Acipenser oxyrhynchus.</i> |
| 90. <i>Palinurichthys perciformis.</i> | 158. <i>Acipenser brevirostris.</i> |
| 91. <i>Poronotus triacanthus.</i> | 160. [<i>Torpedo occidentalis.</i>] |
| 92. [<i>Zenopsis ocellatus.</i>] | 162. <i>Raia erinacea.</i> |
| 93. [<i>Cynoscion regalis.</i>] | 163. <i>Raia radiata.</i> |
| 94. [<i>Pogonias chromis.</i>] | 164. [<i>Raia eglanteria.</i>] |
| 95. [<i>Menticirrus nebulosus.</i>] | 165. <i>Raia laevis.</i> |
| 96. [<i>Stenotomus argyrops.</i>] | 166. <i>Raia ocellata.</i> |
| 101. [<i>Centropristis atrarius.</i>] | 168. [<i>Lamna cornubica.</i>] |
| 105. <i>Roccus lineatus.</i> | 169. [<i>Carcharodon Atwoodi.</i>] |
| 106. <i>Morone americana.</i> | 170. [<i>Cetorhinus maximus.</i>] |
| 107. <i>Pomatomus saltatrix.</i> | 171. [<i>Eugomphodus littoralis.</i>] |
| 108. [<i>Pseudopriacanthus altus.</i>] | 172. <i>Alopias vulpes.</i> |
| 109. <i>Ammodytes americanus.</i> | 173. [<i>Sphyrna zygaena.</i>] |
| 110. [<i>Ammodytes dubius.</i>] | 174. [<i>Eulamia obscura.</i>] |
| 111. [<i>Echeneis naucrateoides.</i>] | 176. <i>Mustelus canis.</i> |
| 112. <i>Remoropsis brachyptera.</i> | 177. <i>Squalus americanus.</i> |
| 113. <i>Remora jacobæa.</i> | 180. [<i>Echinorhinus spinosus.</i>] |
| 114. <i>Chirostoma notatum.</i> | 181. [<i>Somniosus microcephalus.</i>] |
| 115. [<i>Mugil brasiliensis.</i>] | 182. <i>Petromyzon marinus.</i> |
| 116. <i>Belone longirostris.</i> | 183. <i>Myxine glutinosa.</i> |
| 117. <i>Scomberesox scutellatus.</i> | |

The following list includes the species known to occur in the fresh and brackish water of Essex County, thirty-seven in number, seventeen of which, having already been mentioned as inhabitants of the sea, are printed in italics.

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| 14. <i>Gasterosteus pungitius.</i> | 123. <i>Esox americanus.</i> |
| 15. <i>Apeltes quadracus.</i> | 132. <i>Salmo salar.</i> |
| 32. <i>Microgadus tomcodus.</i> | 132a. <i>Salmo salar sebago.</i> |
| 68. <i>Uranidea gracilis.</i> | 133. <i>Salvelinus fontinalis.</i> |
| 97. <i>Lepiopomus auritus.</i> | 137. <i>Alosa sapidissima.</i> |
| 98. <i>Eupomotis aureus.</i> | 138. <i>Pomolobus vernalis.</i> |
| 99. <i>Enneacanthus obesus.</i> | 139. <i>Pomolobus aestivalis?</i> |
| 100. <i>Micropterus pallidus.</i> | 141. <i>Brevoortia tyrannus.</i> |
| 100a. <i>Micropterus achigan?</i> | 143. <i>Catostomus tere.</i> |
| 102. <i>Perca fluviatilis.</i> | 144. <i>Erimyzon sucetta.</i> |
| 103. <i>Boleosoma Olmstedii.</i> | 145. <i>Carassius auratus.</i> |
| 104. <i>Boleichthys fusiformis.</i> | 146. <i>Luxilus cornutus.</i> |
| 105. <i>Roccus lineatus.</i> | 147. <i>Notemigonus chrysoleucus.</i> |
| 106. <i>Morone americana.</i> | 148. <i>Semotilus bullaris.</i> |
| 116. <i>Belone longirostris.</i> | 149. <i>Rhinichthys atronasus.</i> |
| 118. <i>Hydrargyra majalis.</i> | 150. <i>Amiurus catus.</i> |
| 119. <i>Fundulus pisculentus.</i> | 152. <i>Anguilla vulgaris.</i> |
| 120. <i>Fundulus nigrofasciatus.</i> | 157. <i>Acipenser oxyrhynchus.</i> |
| 121. <i>Fundulus multifasciatus.</i> | 158. <i>Acipenser brevirostris.</i> |
| 122. <i>Esox reticulatus.</i> | |

The following list of names, fifty-seven in number, represents the fauna of the off-shore banks. Twenty-eight species, the names of which are given in italics, have already been referred to as occurring in Massachusetts Bay. *Hippocampus antiquorum* was obtained at the surface. *Trygon centrura* is a southern straggler to the shoals of George's Banks. The remaining twenty-seven species are found only at sea, at depths of 80 to 400 or 500 fathoms, and in water colder than 38° F. Twenty-nine of the species included in this list have been added to the fauna of New England and Nova Scotia within two years by the labors of the U. S. Fish Commission.

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| 1. <i>Lophius piscatorius.</i> | 27. <i>Platysomatichthys hippoglossoides.</i> |
| 2. <i>Mola rotunda.</i> | 28. <i>Macrurus Fabricii.</i> |
| 7. <i>Hippocampus antiquorum.</i> | 29. <i>Macrurus Bairdii.</i> |
| 21. <i>Glyptocephalus cynoglossus.</i> | 30. <i>Gadus morrhua.</i> |
| 23. <i>Hippoglossoides platessoides.</i> | 31. <i>Pollachius carbonarius.</i> |
| 26. <i>Hippoglossus vulgaris.</i> | |

34. *Phycis chuss*.
 38. *Haloporphyrus viola*.
 40. *Brosmius brosmæ*.
 41. *Merluccius bilinearis*.
 42. *Lycodes Verrillii*.
 43. *Lycodes VahlIIi*.
 44. *Lycodes paxillus*.
 52. *Anarrhichas lupus*.
 53. *Anarrhichas minor*.
 54. *Anarrhichas latifrons*.
 60. *Liparis ranula*.
 69. *Centridermichthys uncinatus*.
 70. *Triglops Pingelii*.
 72. *Sebastes marinus*.
 75. *Xiphias gladius*.
 76. *Scomber scombrus*.
 83. *Oreynus alatunga*.
 84. *Oreynus argentivittatus*.
 90. *Palinurichthys perciformis*.
 92a. *Lampris guttatus*.
 109. *Ammodytes americanus*.
 112. *Remoropsis brachyptera*.
 117. *Scombrosox saurus*.
 124. *Chauliodus Sloanei*.
 125. *Scopelus gemmifer*.
 126. *Scopelus speculiger*.
 127. *Scopelus Humboldtii?*
 128. *Echiostoma barbatum*.
 129. *Malacosteus niger*.
 130. *Argentina syrtensium*.
 134. *Alepidosaurus ferox*.
 135. *Alepocephalus Bairdii*.
 136. *Clupea harengus*.
 153. *Nemichthys scolopaceus*.
 154. *Synaphobranchus pinnatus*.
 155. *Saccopharynx flagellum*.
 156. *Simenchelys parasiticus*.
 159. *Chimæra plumbea*.
 161. *Raia granulata*.
 165. *Raia lævis*.
 167. *Trygon centrura*. (*Georges.*)
 175. *Prionodon lamia*.
 177. *Squalus acanthias*.
 178. *Centroscyllum Fabricii*.
 179. *Centroscymnus cœlolepis*.
 181. *Somniosus microcephalus*.

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NOTE.—The references in this index are to the *current numbers* of the species. The synonyms, as well as the accepted names, are indexed, and there can be no trouble in making out the names employed by Storer and other early writers on the fishes of New England.

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